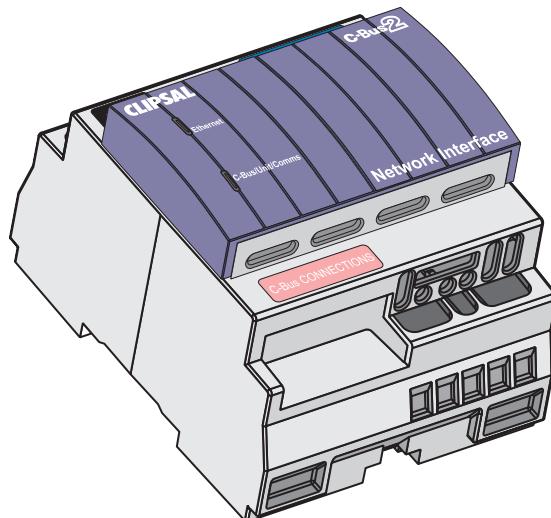




C-Bus Network Interface
Installation Instructions
5500CN Series



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1.0 Product Range

5500CN C-Bus Network Interface (with 12 V DC, 500 mA AU plug pack)

E5500CN C-Bus Network Interface (no plug pack included)

2.0 Important Notes

- Both Ethernet and C-Bus connections are made via RJ45 sockets. Ensure you make each connection to the correct socket.
- The use of any software not provided by Clipsal Integrated Systems (CIS) in conjunction with the installation of this product may void any warranty applicable to the hardware.

3.0 Description

The 5500CN Series C-Bus Network Interface (CNI) provides an isolated communication path between a C-Bus and Ethernet network. When used in conjunction with an Ethernet connected PC, this allows a C-Bus network (or multi-network installation) to be:

- programmed with the C-Bus Toolkit software
- monitored and data logged using appropriate software
- controlled by C-Bus automation software such as Schedule Plus or HomeGate.

The control, monitoring and even programming of C-Bus networks can be performed at any practical location which has a connection to the Ethernet network; even off site.

The CNI contains a C-Bus network burden, and is capable of generating a C-Bus system clock signal. The unit is DIN rail mounted, measuring 4 modules wide (1 module = 17.5 mm).

4.0 Wiring Instructions

The 5500CN and E5500CN are powered by a 12 V AC or DC plug pack (supplied with the 5500CN). Power connection is non-polarised and made via screw terminals. Ethernet and C-Bus connections are made via RJ45 sockets. Ethernet may be connected to a network via a switch or hub, or directly to a PC (using a crossover cable). Refer to Figure 1 and Figure 2.

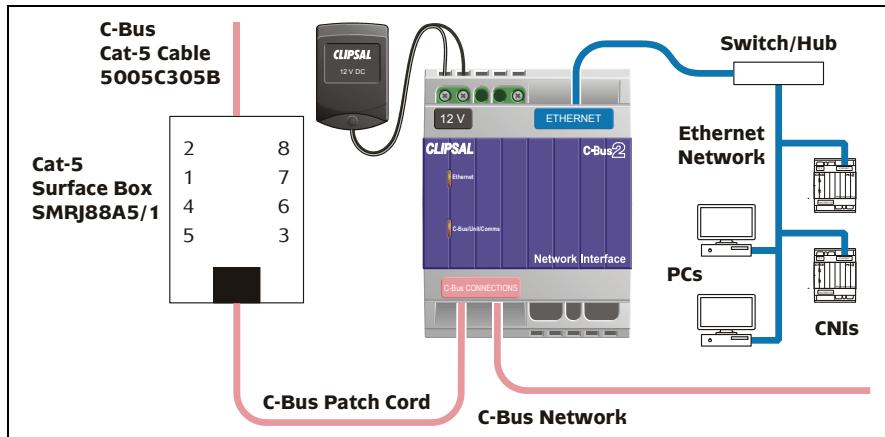


Figure 1 – 5500CN/E5500CN used with an Ethernet network

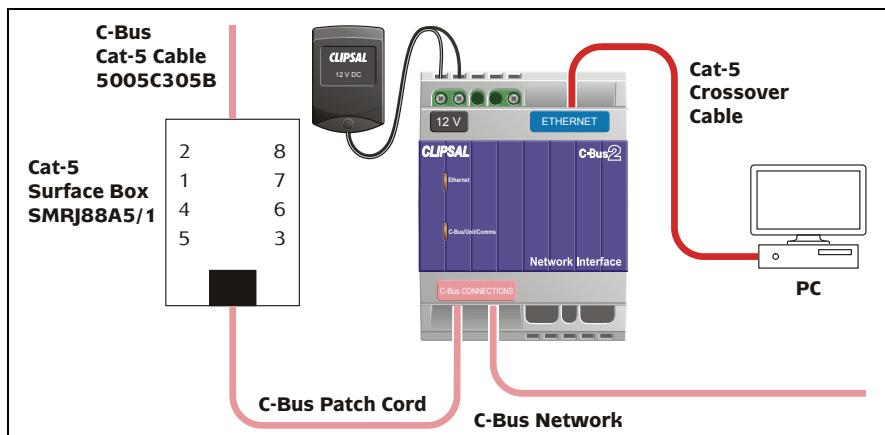


Figure 2 – 5500CN/E5500CN used with a direct PC connection

5.0 C-Bus Network Connection

Connection to the C-Bus network is made via one of the RJ45 sockets. Use Cat-5 Unshielded Twisted Pair (UTP) C-Bus cable, and an appropriately wired RJ45 plug. Pinouts and cable conductor assignments are provided in Figure 3 and Table 1. The RJ45 sockets are internally connected. The Clipsal catalogue number for the C-Bus Cat-5 UTP cable is 5005C305B.

It is recommended that the Remote Override (On/Off) connections be maintained for correct operation of these services across the C-Bus network, even if they are not intended to be used.

A Clipsal RJ5CB300PL Cat-5 UTP patch cord is included with the unit for easy interconnection. Rubber bungs are supplied ($\times 3$) for unused RJ45 connectors, to stop foreign bodies from entering the unit. Always ensure these bungs are installed when the unit is mounted inside a mains rated enclosure.

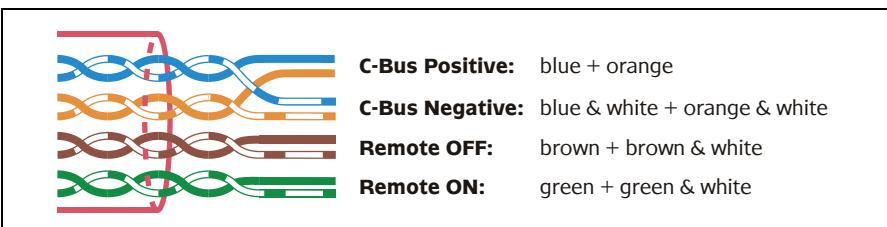
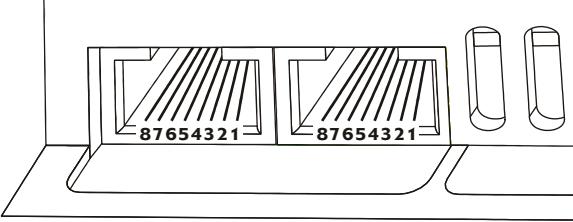


Figure 3 – C-Bus cable conductor assignments

Pin	C-Bus Connection	Colour
1	Remote ON	green & white
2	Remote ON	green
3	C-Bus Negative (-)	orange & white
4	C-Bus Positive (+)	blue
5	C-Bus Negative (-)	blue & white
6	C-Bus Positive (+)	orange
7	Remote OFF	brown & white
8	Remote OFF	brown



The diagram illustrates the internal structure of two RJ45 connectors. Each connector is shown with its eight pins visible. The pins are labeled with their respective numbers: 8, 7, 6, 5, 4, 3, 2, and 1. The labels are positioned below the pins. To the right of the connectors, there are two cylindrical components, likely resistors or capacitors, arranged vertically.

Table 1 – RJ45 sockets and C-Bus pinouts

6.0 Status Indicators

6.1 Ethernet

The “Ethernet” indicator shows the status of the Ethernet interface. The indicator is orange when the communication link is good (flashing green with active data transfer), and red with a problematic or non-existent link. Refer to Table 2.

Indicator Status	Meaning
Orange	Communication link is good
Orange/Green flash	Link is good with active data transfer
Red	Non-existent or problematic link
5 × red flashes on power-up	Problematic link (no DHCP server found)

Table 2 – The Ethernet indicator

6.2 C-Bus/Unit/Comms

The “C-Bus/Unit/Comms” indicator shows the status of the C-Bus network at the unit. It also flashes on active communication between the C-Bus and Ethernet networks. Orange is good, green indicates active communication and red indicates problems. Refer to Table 3.

Indicator Status	Meaning
Orange	C-Bus clock signal is present, voltage is good
Orange/Green flash	C-Bus good, active communication between C-Bus and Ethernet
Red	No C-Bus connection
Red flash	No C-Bus connection, attempted communication from Ethernet to C-Bus
Red/Orange flash	C-Bus clock is present, voltage is marginal

Table 3 – The C-Bus/Unit/Comms indicator

Further debugging of possible network problems can be achieved using the Clipsal C-Bus Network Analyser tool (5100NA).

7.0 C-Bus System Clock

The 5500CN Series C-Bus Network Interface (CNI) incorporates a software selectable C-Bus system clock. The system clock is used to synchronise data communication on a C-Bus network. At least one active C-Bus system clock is required on each C-Bus network for successful communication. No more than three units on a C-Bus network should have their clock enabled, so this option is normally disabled using the C-Bus Toolkit software.

If a system clock is required, it can be enabled from the unit's programming interface in the C-Bus Toolkit software.

8.0 C-Bus Network Burden

The CNI incorporates a software selectable network burden. The network burden can be enabled from the unit's programming interface in the C-Bus Toolkit software, but only if the C-Bus system clock is also enabled.

One network burden is normally required to ensure correct operation of each C-Bus network. The Network window of a C-Bus Toolkit project provides a summary of a C-Bus network according to the units added to the Database. This can be helpful in determining how many burdens are required on a particular network.

9.0 C-Bus Power Requirements

The CNI does not draw current from the C-Bus network.

10.0 Power Surges

Each unit incorporates circuitry to provide protection from C-Bus network transients. External power surge protection devices should be used to enhance system immunity to mains power surges. It is strongly recommended that overvoltage equipment such as the Clipsal 970 be installed at the switchboard.

11.0 Megger Testing

Important points when megger testing an electrical installation:

- Only megger test when mains cabling is disconnected from C-Bus output units.
- Do not megger test the C-Bus cable.

12.0 Configuration

12.1 C-Bus Programming

The 5500CN Series C-Bus Network Interface (CNI) must be programmed with a unique identification address (Unit Address). This is accomplished using the C-Bus Toolkit software, available from the downloads section of the Clipsal Integrated Systems (CIS) web site (<http://www.clipsal.com/cis>). C-Bus Toolkit is also used to enable the C-Bus system clock and burden if required.

12.2 Ethernet Setup

The 5500CN Series C-Bus Network Interface (CNI) is capable of using a DHCP server to configure its IP address, or it may be configured with a static IP address. In its factory default state, the unit uses a DHCP server.

If you are using a new CNI (with factory settings) on a network which uses a DHCP server, you do not need to configure the unit's Ethernet settings. In other cases, you must configure the Ethernet settings (unless the unit is set to an acceptable, known static IP address). Do this on your connected PC using either:

- telnet (Windows XP or Linux platform)
- a web browser (Windows XP or Linux platform, with Java installed)
- the Lantronix DeviceInstaller software (Windows platform, with Microsoft .NET framework installed).

Whichever method you choose, connect the Ethernet ports of your PC and CNI (either directly or via a network switch or hub). Use a crossover network cable if using a direct connection. The CNI's Ethernet indicator will be orange if the Ethernet connection is wired correctly.

The PC must be configured with an IP address; either static or dynamic/automatic (if a DHCP server is connected). If you are using a network/Internet firewall, you may need to disable it temporarily.

If you use the telnet or web browser configuration method, you must first use your operating system's ARP utility to assign the CNI with a temporary IP address. (An exception to this is if the CNI is already set to a known IP address which is compatible with the PC's IP address and is not used by another device on the network).

Using the ARP Utility (before using telnet or a web browser)

- 1) Note the IP address of your PC. In Windows you can do this by entering `ipconfig` at a command prompt.
- 2) Choose an IP address to temporarily use with the CNI (it need not be the permanent address you want to assign to the CNI). The address must be compatible with the IP address of your PC, and not used by any other Ethernet device connected to the same network. For example, if your PC is set to 192.168.0.5, set the CNI to an IP address from 192.168.0.1 to 192.168.0.4 or 192.168.0.6 to 192.168.0.254. If the IP address of your PC is set automatically by a DHCP server, it is safest to choose an IP address which is much higher. For example, if your PC is set to 192.168.0.5, use something like 192.168.0.200 for the CNI.
- 3) Start a command prompt/terminal session. In Windows this is found in `start/All Programs/Accessories/`. If you are using Linux, you will need to run as root.
- 4) Type `arp -s` followed by the temporary IP address you are using with the CNI, followed by a space, then the CNI's MAC address. The MAC address is printed on a label attached to the side of the CNI. The MAC address is a set of six hexadecimal number pairs, separated by a dash or colon.

For example, to use an IP address of 192.168.0.12 on a CNI with a MAC address of 00-20-4A-2C-18-04, type:

```
arp -s 192.168.0.12 00-20-4a-2c-18-04 (Windows platform)  
or arp -s 192.168.0.12 00:20:4a:2c:18:04 (Linux platform).
```

After pressing Enter, this causes the CNI to temporarily set its IP address to the one specified. If configuration is not completed, the unit will revert to its previous setting when power is removed.

Using Telnet to Configure the CNI

In the instructions below, substitute *cni_ip_addr* for the temporary IP address you are using with the CNI.

- 1) Type the following from a command prompt/terminal session, then press Enter:

```
telnet cni_ip_addr 1
```

You should get a response something like "Could not connect to host" or "Connection refused".

- 2) Type the following, then press Enter:

```
telnet cni_ip_addr 9999
```

You should get a response from the "Lantronix Universal Device Server", and be prompted to "Press Enter to go into Setup Mode".

- 3) Press Enter within 5 seconds of the response (before the connection times out).

The Change Setup menu will be displayed.

- 4) Use this menu and follow the prompts to configure the CNI. Typically, press 0 for Server Configuration, then enter the permanent IP address you want to set the CNI to. When prompted to enter the netmask number of bits, refer to Table 4. In most cases you can choose 0 for default. Once you have configured the settings, you must choose option 9 "Save and exit", in order for the changes to be applied.

Netmask	Bits
Default	0
255.255.255.252	2
255.255.255.248	3
255.255.255.240	4
255.255.255.224	5
255.255.255.192	6
255.255.255.128	7
255.255.255.0	8

Netmask	Bits
255.255.254.0	9
255.255.252.0	10
255.255.248.0	11
255.255.240.0	12
255.255.224.0	13
255.255.192.0	14
255.255.128.0	15
255.255.0.0	16

Netmask	Bits
255.254.0.0	17
255.252.0.0	18
255.248.0.0	19
255.240.0.0	20
255.224.0.0	21
255.192.0.0	22
255.128.0.0	23
255.0.0.0	24

Table 4 – Netmask number of bits

Using a Web Browser to Configure the CNI

If your web browser is set to use a proxy server, temporarily change it to access the Internet/network directly. In the instructions below, substitute *cni_ip_addr* for the temporary IP address you are using with the CNI.

- 1) Type the following into the Address/URL field of your browser, then press Enter:

`http://cni_ip_addr:1`

You should get a response explaining that the page cannot be displayed. If the browser cancels the request and states that the address is restricted, you must substitute this step with Step 1 of the Telnet configuration method (on the previous page).

- 2) Type the following address, then press Enter:

`http://cni_ip_addr`

A Java applet will load containing the Lantronix Web-Manager. Use this interface to configure the CNI. Typically, click the Server Properties button, then enter the permanent IP address you want to set the CNI to. Once you have configured the settings, you must click the Update Settings button, in order for the changes to be applied.

 **NOTE** If the Web-Manager loads but the menu buttons are non-responsive, try clicking the "Back to Web-Manager" button at the top right of the window.

The Lantronix DeviceInstaller Software

DeviceInstaller is a software utility produced by Lantronix. It is suitable for use on a Windows platform which has the Microsoft .NET framework installed. DeviceInstaller can be downloaded from the downloads page of the Clipsal Integrated Systems (CIS) web site (www.clipsal.com/cis) or from the Lantronix web site (www.lantronix.com).

An application note for using the DeviceInstaller software is provided with the software at the CIS web site.

13.0 Factory Default Ethernet Settings

13.1 Server Configuration

Parameter	Setting
IP address	0.0.0.0
Gateway IP address	Not set
Netmask	Default

Parameter	Setting
Telnet password	None
DHCP device name	Not set

13.2 Channel 1 Configuration

Parameter	Setting
Baud rate	9600
I/F mode	4C
Flow	00
Port number	10001
Connect mode	C0
Remote IP address	0.0.0.0

Parameter	Setting
Remote port	0
Disconn mode	00
Flush mode	00
Disconn time	00:00
SendChar 1	00
SendChar 2	00

13.3 Expert Settings

Parameter	Setting
TCP Keepalive time	45 s

Parameter	Setting
ARP cache timeout	600 s

13.4 Security

Parameter	Setting
SNMP	Enabled
SNMP comm. name	public
Telnet setup	Enabled
TFTP download	Enabled

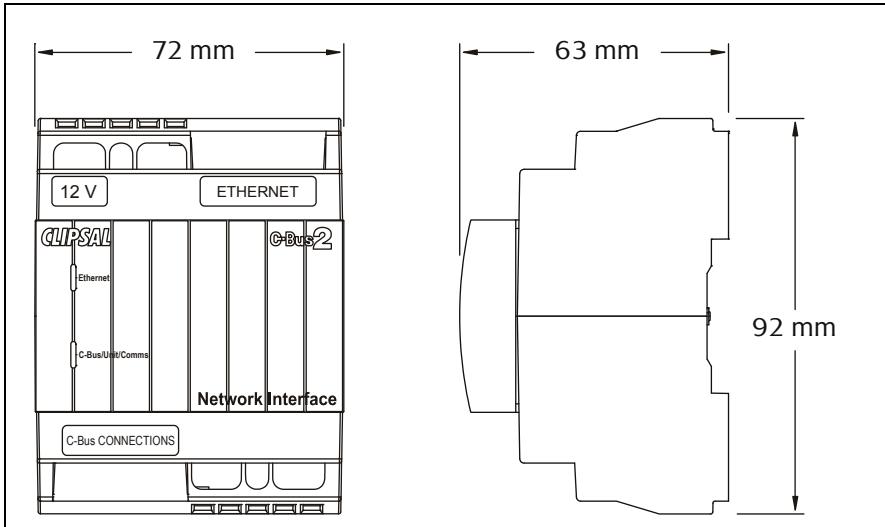
Parameter	Setting
Port 77FEh	Enabled
Web server	Enabled
ECHO	Enabled
Enhanced password	Disabled

14.0 Electrical Specifications

Parameter	Description
Supply voltage	12 V DC or AC @ 300 mA
C-Bus input voltage	15 to 36 V DC. Does not draw current from the C-Bus network.
C-Bus AC input impedance	100 kΩ @ 1 kHz
Ethernet characteristics	10 Base-T
Warm up time	5 seconds (approximately)
C-Bus system clock	Software selectable
Network burden	Software selectable
Operating temperature range	0 to 45 °C (32 to 113 °F)
Operating humidity range	10 to 95% RH

15.0 Mechanical Specifications

Parameter	Description
Dimensions (W×H×D)	72 × 92 × 63 mm
Weight	152 g
C-Bus Connections	2 × RJ45 sockets (in parallel)
Ethernet Connection	1 × RJ45 socket



16.0 Standards Complied

DECLARATIONS OF CONFORMITY

Australian/New Zealand EMC & Electrical Safety Frameworks and Standards

5500CN and E5500CN products comply with the following:



Regulations	Standard	Title
EMC (C-Tick)	AS/NZS CISPR 22	IT Equipment - Radio Disturbance Characteristics

European Directives and Standards

5500CN and E5500CN products comply with the following:



European Council Directive	Standard	Title
EMC Directive 89/336/EEC	EN 55022	IT Equipment - Radio Disturbance Characteristics
	EN 55024	IT Equipment - Immunity Characteristics
	EN 61000-3-2	Limits for Harmonic Current Emissions
	EN 61000-3-3	Limitation of Voltage Changes, Voltage Fluctuations and Flicker

Other International Directives and Standards

5500CN and E5500CN products comply with the following:

Regulations	Standard	Title
EMC	CISPR 22	IT Equipment – Radio Disturbance Characteristics
	CISPR 24	IT Equipment - Immunity Characteristics

17.0 Warranty

The 5500CN Series C-Bus Network Interface carries a two-year warranty against manufacturing defects.

Warranty Statement

- 1) The benefits conferred herein are in addition to, and in no way shall be deemed to derogate; either expressly or by implication, any or all other rights and remedies in respect to Clipsal Integrated Systems Product, which the consumer has under the Commonwealth Trade Practices Act or any other similar State or Territory Laws.
- 2) The warrantor is Clipsal Australia Pty Ltd. with registered offices in all Australian States.
- 3) This Clipsal Integrated Systems Product is guaranteed against faulty workmanship and materials for a period of two (2) years from the date of installation.
- 4) Clipsal Australia Pty Ltd reserves the right, at its discretion, to either repair free of parts and labour charges, replace or offer refund in respect to any article found to be faulty due to materials, parts or workmanship.
- 5) This warranty is expressly subject to the Clipsal Integrated Systems Product being installed, wired, tested, operated and used in accordance with the manufacturer's instructions.
- 6) All costs of a claim shall be met by Clipsal Australia Pty Ltd, however should the product that is the subject of the claim be found to be in good working order, all such costs shall be met by the claimant.
- 7) When making a claim, the consumer shall forward the Clipsal Integrated Systems Product to the nearest office of Clipsal Australia Pty Ltd with adequate particulars of the defect within 28 days of the fault occurring. The product should be returned securely packed, complete with details of the date and place of purchase, description of load, and circumstances of malfunction.

For all warranty enquiries, contact your local Clipsal sales representative. The address and contact number of your nearest Clipsal Australia office can be found at <http://www.clipsal.com/locations> or by telephoning Technical Support (refer to the back page).

Technical Support and Troubleshooting

For further assistance in using this product, consult your nearest Clipsal Integrated Systems (CIS) Sales Representative or Technical Support Officer.

Technical Support Contact Numbers	
Australia	1300 722 247 (CIS Technical Support Hotline)
New Zealand	0800 888 219 (CIS Technical Support Hotline)
Northern Asia	+852 2484 4157 (Clipsal Hong Kong)
South Africa	011 314 5200 (C-Bus Technical Support)
Southern Asia	+603 7665 3555 Ext. 236 or 242 (CIS Malaysia)
United Kingdom	0870 608 8 608 (Schneider Electric Support)

Technical Support email: tech.training@clipsal.com.au

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